

## REFERENCES

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## SHORT COMMUNICATION

*Calocoris alpestris* (Meyer-Dür), *Lygus wagneri* Remane and *Dicyphus constrictus* (Boheman), species with boreo-montane or boreo-alpine distributions expanding in Gloucestershire.—The heteropteran fauna of Gloucestershire has recently been described in detail (Alexander, 1995 & 1996), making it possible to analyse the fauna and identify trends. One of the more noticeable recent trends has been the expansion of species that are largely of a northern and western distribution in Britain and either boreo-montane (the first two species) or boreo-alpine (the last) in Europe (Southwood, 1957). These might have been expected to be contracting in range in line with human-induced climate change. Prior to the start of the project only *Calocoris alpestris* had been reported from the county (Ackland, 1958) while both *Lygus wagneri* and *Dicyphus constrictus* were yet to be noticed locally. These are all largely species of damp woodlands, associated with tall ground vegetation.

*Calocoris alpestris*

*Calocoris alpestris* lives on nettle in or at the margins of damp woods. It is a large and obvious bug and so a surprising omission from the earlier lists; it has presumably increased in abundance locally, conceivably being a recent colonist. It was first noticed in the county in 1957 at Tockington (ST68) and subsequently at Waterley Bottom (ST79) in 1958 (Ackland, 1958). Since then the present author has found it in twelve further woodland sites, throughout the Cotswold dip slope:

- SO80 Watledge Hill, 3.vi.1985; Rabbit Warren Wood, Selsley, 25.v.1998.
- SO90 Hailey Wood, 5.vi.1993; Francombe Wood & Pinbury Park, 21.vi.1998.
- SO92 Dowdeswell Wood, 29.v.1995.
- SP00 Perrotts Brook, 4.vi.1995; Ampney Riding, 14.vi.1998.
- SP01 Chedworth Woods, 31.v.1993.
- SP02 Guiting Wood, 31.v.1993.
- ST78 Lower Woods, 31.v.1997.
- ST79 Alderley Wood, plentiful, 23.v.1998.

J. P. Widgery (pers.comm.) has also subsequently found it in some of these as well as additional sites, and A. P. Foster in one further site. The first record from the Wye Valley was made in 2000 by P. Kirby.

*Lygus wagneri*

*Lygus wagneri* was only discovered in the county in 1988. It feeds on a wide variety of herbs in woodland clearings and margins, and hedgerows: dock, nettle, St John's wort, etc. The present author has found it in a total of six woods across the Cotswolds, while J. P. Widgery has recently added a seventh.

SO90 Siccaridge Wood, 1.v.1989; Sapperton Valley, 29.v.1993.

SO91 Hilcot Wood, 16.v.1999.

SP01 Colesbourne, 29.viii.1988.

SP02 Guiting Wood, 31.v.1993.

SP11 Chedworth, 31.v.1993.

### *Dicyphus constrictus*

*Dicyphus constrictus* is the most recent discovery, found in the county in 1989, and remains the least widespread of the three. It has mainly been found on hedge woundwort. Three of the sites are Cotswold while the fourth lies on a Severn River cliff at Fretherne.

SO70 Hock Cliff, Fretherne, 28.viii.1995.

SO80 Rabbit Warren Wood, Selsley, 25.v.1998

SO90 Oakley Wood, 30.ix.1989.

ST79 Alderley Wood, 23.v.1998.

It is not possible to say whether any of the three species are long-term residents in Gloucestershire or recent colonists. It is feasible that they could have escaped attention through being present in very low numbers and in a small number of poorly worked sites. It is clear, however, that their local abundance has dramatically increased in recent decades. The relatively recent discovery of one boreal species in the county and its subsequent expansion would be interesting enough, but for the pattern to be repeated across three species is remarkable.

P. Kirby (pers. comm.) has suggested that *D. constrictus* and *L. wagneri*—and possibly also *C. alpestris*—are perhaps tolerant of (but not dependent on) cold, but intolerant of drought, and so a positive response to a warming climate might be less surprising than might at first appear. Climate change could therefore explain the changes. He also suggests that changing woodland management practices might also explain the expansion of these three damp-loving species. The woods concerned are certainly mainly closed-canopy stands. Some are neglected coppices but others are of high forest or old wood-pasture structure. It is difficult to readily identify any major change in structure through the last 30 years other than increasing shade. So are these expansions a response to changing climate or increasing shade in woodlands?

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